

REMARKS

This Amendment responds to the Office Action dated October 16, 2003 in which the Examiner objected to the drawings, rejected claims 1-25 under 35 U.S.C. §112, second paragraph and rejected claims 1-23 under 35 U.S.C. §103.

Attached to this Amendment is an annotated Fig. 9 which shows the incident angle adjusting mechanism and new Fig. 14 which shows the pumping light-signal light coupling means. Replacement sheets will be provide when approved by the Examiner. Applicants respectfully request that the Examiner withdraws the objection to the drawing.

As indicated above, minor informalities in the specification have been corrected. Applicants note that a semiconductor laser is also known as a laser diode. Attached please find an excerpt from an Electronic Technical Encyclopedia which provides the definition of a laser diode (i.e. semiconductor laser). Applicants respectfully request the Examiner approves the amendments to the specification.

Claims 1-25 were rejected under 35 U.S.C. §112, second paragraph.

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §112 second paragraph. Applicants respectfully submit that essential elements are not omitted from the claims. Applicants respectfully submit that a person of ordinary skill in the art would understand that a semiconductor laser (i.e. laser diode) includes a substrate, cladding layers, buffer layers, etc. Furthermore, Applicants do not believe that the claims are written using circular reasoning since a semiconductor laser device is different from a semiconductor laser. However, as an accommodation to the Examiner, the term semiconductor laser has been changed to its synonymous meaning of laser diode (please see the attached excerpt from the

Electronic Technical Encyclopedia). Additionally, Applicants do not believe that essential structural cooperative relationship between the elements is omitted from claim 8. However, as an accommodation, claim 8 has been amended. Similarly, claims 24-25 have been amended. It is respectfully submitted that the rejection to the claims under 35 U.S.C. §112 second paragraph no longer applies. Therefore, Applicants respectfully request the Examiner withdraws the rejection to the claims under 35 U.S.C. §112 second paragraph.

As indicated above, claims 1-6, 8-9, 12-18, 20, 24 and 25 have been amended. Applicants respectfully submit that the amendments do not narrow the literal scope of the claims and are unrelated to a statutory requirement for patentability.

Claim 1 claims a semiconductor laser device comprising an optical fiber having an optical fiber grating, a laser diode having a plurality of layers including an active layer with a single quantum well, for emitting laser light and a coupling optical system for coupling the laser light emitted out of the laser diode into the optical fiber. The optical fiber grating has a wavelength characteristic which maintains a constant emission wavelength of the laser diode.

Through the structure of the claimed invention having an optical fiber grating having a wavelength characteristic which maintains a constant emission wavelength of a laser diode, as claimed in claim 1, the claimed invention provides a semiconductor laser device having a simple structure while being capable of maintaining a constant emission wavelength without having to use a temperature control mechanism. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claim 13 claims a semiconductor laser device comprising an optical fiber, a laser diode and a coupling optical system. The optical fiber has an optical fiber grating. The laser diode has a plurality of layers including an active layer with two or more quantum wells formed at intervals that are close enough to provide quantum coupling for emitting laser light. The coupling optical system couples the laser light emitted out of the laser diode into the optical fiber.

Through the structure of the claimed invention having a laser diode have an active layer with two or more quantum wells formed at intervals that are close enough to provide quantum coupling, as claimed in claim 13, the claim invention provides a semiconductor laser device having a simple structure while capable of maintaining a constant emission wavelength without using a temperature control mechanism. The prior art does not show, teach or suggest the invention as claimed in claim 13.

Claims 1-23 were rejected under 35 U.S.C. §103 as being unpatentable over *Namiwaka* (U.S. Patent No. 6,411,639).

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, Applicants respectfully request the Examiner withdraws the rejection to the claims and allows the claims to issue.

Namiwaka appears to disclose a semiconductor laser module which is preferable for use for an semiconductor laser module with an external resonator. (Col. 1, lines 8-10) Prior art technique to oscillate a semiconductor laser element at a wave length in a narrow band range comprises using an external resonator which is formed between a reverse side (HR side) of the semiconductor laser element 1

and a fiber grating 7 by providing an optical fiber 5 with the fiber grating 7 having a diffractive grating in a semiconductor laser element 1 oscillatable wave length range as shown in FIG. 3 or using an external resonator which is formed by feedbacking the light which has transmitted through a band-pass filter 4 which transmits light having a predetermined wave length in a semiconductor laser element 1 oscillating wave length range to the semiconductor laser element 1 by means of a reflecting point 8 which is deposited on the tip end of a pig-tail fiber by an HR coat as shown in FIG. 4. (Col. 1, lines 19-32) In a preferred mode, the semiconductor laser module at least comprises a semiconductor laser element (reference numeral 1 in FIG. 1), a lens system for condensing laser light onto an optical fiber (reference numerals 2, 3 in FIG. 1), a band-pass filter (reference numeral 4 in FIG. 1) for transmitting laser light having a predetermined wave length and an optical fiber. The band-pass filter is held by means of a holding device having a tilting mechanism for tilting the band-pass filter at a desired angle relative to the travelling direction of the laser light. A reflecting point (6 in FIG. 1) for reflecting part of the incident laser light is provided in a wave guide of the optical fiber so that a resonator is formed between the reflecting point and the emitting end face of the semiconductor laser element. Preferably, control of the tilting mechanism is conducted via a control unit in response to an output from a thermal sensor. (Col. 2, lines 39-56) The semiconductor laser module with the external resonator of the present embodiment takes out light emitted by a semiconductor laser element 1 from an optical fiber 4 by coupling the semiconductor laser element 1 with the optical fiber 5 at a high efficiency. Reference numerals 1, 2 and 3 in the drawing denote the semiconductor laser element, a first and second lens, respectively. The first lens 2 has a capability of converting the emitted light,

which is diverged from the semiconductor laser element 1, into collimated light. The second lens 3 is adapted to focus said collimated light onto an end face of an optical fiber 5 so that the parallel light is incident upon the optical fiber 5 efficiently. (Col. 3, lines 3-15)

Thus, *Namiwaka* merely discloses a semiconductor laser element 1. However, nothing in *Namiwaka* shows, teaches or suggests a) a laser diode having an active layer with a single quantum well and b) optical fiber grating having a wavelength characteristic which maintains a constant emission wavelength of the laser diode as claimed in claim 1. Rather, *Namiwaka* merely discloses a laser element 1 and a fiber grating 7.

Additionally, *Namiwaka* merely discloses a semiconductor laser element 1 and an optical fiber 5 having a reflecting point 6. Nothing in *Namiwaka* shows, teaches or suggests a laser diode having an active layer with quantum wells formed at intervals which are close enough to provide quantum coupling as claimed in claim 13. Rather, *Namiwaka* merely discloses a semiconductor laser element 1.

Applicants respectfully traverse the Examiner's statement that it would be obvious to use any type of active layer in order to obtain a desired wavelength output, power and/or efficiency. Nowhere in *Namiwaka* it is shown, taught or suggested using quantum wells formed at intervals which are close enough to provide quantum coupling as claimed in claim 13.

Since nothing in *Namiwaka* shows, teaches or suggests a) a laser diode having an active layer with a single quantum well and an optical fiber grating having a wavelength characteristic which maintains an emission wavelength of the laser diode constant as claimed in claim 1 or b) a laser diode having an active layer with

quantum wells formed at intervals that are close enough to provide quantum coupling as claimed in claim 13, Applicants respectfully request the Examiner withdraws the rejection to claims 1 and 13 under 35 U.S.C. §103.

Claims 2-12 and 41-23 depend from claims 1 and 13 and recite additional features. Applicants respectfully submit that the rejection to claims 2-12 and 14-23 would not have been obvious within the meaning of 35 U.S.C. §103 over *Namiwaka* at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 2-12 and 41-23 under 35 U.S.C. §103.

New claims 26-28 have been added. Applicants respectfully submit that these claims are also in condition for allowance.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason Examiner feels that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.


In the event that any additional fees are due with this paper, please charge
our Deposit Account No. 02-4800.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: January 12, 2004

By:


Ellen Marcie Envas
Registration No. 32,131

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620